

DIALOG(R)File 351:Derwent WPI
(c) 2005 Thomson Derwent. All rts. reserv.

013156766 **Image available**

WPI Acc No: 2000-328638/200028

Related WPI Acc No: 2000-258992; 2000-317371; 2000-328605; 2003-334767;
2004-794341

XRAM Acc No: C00-099507

XRFX Acc No: N00-247413

Water-soluble semiconductor nanocrystals for emitting light in the visible and infrared energy range, comprises a nanocrystal core overcoated with a shell layer and an outer layer at the outer surface of the overcoating layer

Patent Assignee: MASSACHUSETTS INST TECHNOLOGY (MASI)

Inventor: BAWENDI M G; LEE J; MIKULEC F V

Number of Countries: 088 Number of Patents: 006

Basic Patent:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200017655	A1	20000330	WO 99US21375	A	19990917	200028 B

Priority Applications (No Type Date): US 99397436 A 19990917; US 98100947 P 19980918; US 98101046 P 19980918; US 98156863 A 19980918; US 98160454 A 19980924; US 98160458 A 19980924; US 99397428 A 19990917; US 99397432 A 19990917

Designated States (National): AE; AL; AM; AT; AU; AZ; BA; BB; BG; BR; BY; CA; CH; CN; CU; CZ; DE; DK; EE; ES; FI; GB; GD; GE; GH; GM; HR; HU; ID; IL; IN; IS; JP; KE; KG; KP; KR; KZ; LC; LK; LR; LS; LT; LU; LV; MD; MG; MK; MN; MW; MX; NO; NZ; PL; PT; RO; RU; SD; SE; SG; SI; SK; SL; TJ; TM; TR; TT; UA; UG; US; UZ; VN; YU; ZA; ZW

Designated States (Regional): AT; BE; CH; CY; DE; DK; EA; ES; FI; FR; GB; GH; GM; GR; IE; IT; KE; LS; LU; MC; MW; NL; OA; PT; SD; SE; SL; SZ; TZ; UG; ZW; AL; LI; LT; LV; MK; RO; SI

Abstract (Basic): WO 200017655 A1

NOVELTY - A water-soluble semiconductor nanocrystals comprises a semiconductor nanocrystal core of selected band gap energy overcoated with a shell layer of band gap energy greater than that of the core and with appropriate band offsets and further comprises an outer layer at the outer surface of the overcoating layer.

DETAILED DESCRIPTION - The water-soluble semiconductor nanocrystal comprises (i) a semiconductor nanocrystal core of selected band gap energy; (ii) a shell layer overcoating the semiconductor nanocrystal core which comprises a semiconductor material of band gap energy greater than that of the core; (iii) an outer layer which comprises a first portion molecule with at least one linking group for attachment to the nanocrystal and a second portion molecule with at least one hydrophilic group.

INDEPENDENT CLAIMS are also included for the following:

(a) water-soluble semiconductor comprising a semiconductor nanocrystal core of selected band gap energy and an outer layer with a first portion molecule of at least one linking group for attachment to the nanocrystal and a second portion molecule of at least one hydrophilic group;

(b) a water-soluble semiconductor nanocrystal comprising a semiconductor nanocrystal core of selected band gap energy, a shell layer overcoating the semiconductor nanocrystal core which comprises a semiconductor material of band gap energy greater than that of the core and a bilayer overcoating the shell which comprises an inner layer of affinity for the shell and an outer layer with a molecule having a hydrophilic group spaced apart from the inner layer by a hydrophobic

region adjacent to the inner layer; and

(c) a composition comprises a water-soluble nanocrystal dispersed or dissolved in an aqueous medium.

USE - To emit light in the visible and infrared energy range.

ADVANTAGE - The water-soluble semiconductor nanocrystals exhibit high quantum yields with photoluminescence emissions of high spectral purity, it is readily soluble and stable in aqueous systems and demonstrate chemical and electronic stability.

pp; 55 DwgNo 0/6

Title Terms: WATER; SOLUBLE; SEMICONDUCTOR; EMIT; LIGHT; VISIBLE; INFRARED; ENERGY; RANGE; COMPRISE; CORE; OVERCOAT; SHELL; LAYER; OUTER; LAYER; OUTER; SURFACE; OVERCOAT; LAYER

Derwent Class: A85; E19; E37; L03; S03; U11; X26

International Patent Class (Main): C09K-011/08; G01N-033/58

International Patent Class (Additional): C09K-011/02; C09K-011/55;

C09K-011/56; C09K-011/62; C09K-011/64; C09K-011/66; C09K-011/70;

C09K-011/74; C09K-011/75; C09K-011/88; C09K-011/89; H05B-033/10

File Segment: CPI; EPI

Manual Codes (CPI/A-N): A12-L03; A12-W12C; E05-G; E06-H; E07-H; E10-A03;

E10-A05; E10-A07; E10-A09B2; E10-A10; E10-A19B; E10-A22; E10-A24B;

E10-B02; E10-B03; E10-B04; E10-C01; E10-C02; E10-C04; E10-D03; E10-E03;

E31-G; E31-H05; E31-K07; E31-L; E31-M; E31-P06A; E34-B04; E35; L04-A

Manual Codes (EPI/S-X): S03-E04D; S03-E14H; U11-A15; U11-B03; X26-J

Chemical Fragment Codes (M3):

01 A548 A940 B134 C802 C803 C804 C805 C806 C807 M411 M782 M904 M905
Q130 Q454 Q613 R032 R04198-K R04198-M
02 A548 A940 B152 C116 C802 C803 C804 C805 C806 C807 M411 M782 M904
M905 Q130 Q454 Q613 R032 R04508-K R04508-M
03 A548 A940 C116 C540 C730 C801 C802 C803 C804 C805 C806 M411 M782
M904 M905 M910 Q130 Q454 Q613 R032 R01505-K R01505-M
04 A430 A940 C116 C540 C730 C801 C802 C803 C804 C805 C806 M411 M782
M904 M905 M910 Q130 Q454 Q613 R032 R01525-K R01525-M
05 A430 A940 B134 C116 C802 C803 C804 C805 C806 C807 M411 M782 M904
M905 Q130 Q454 Q613 R032 R06977-K R06977-M
06 A430 A940 B152 C116 C802 C803 C804 C805 C806 C807 M411 M782 M904
M905 Q130 Q454 Q613 R032 R08290-K R08290-M
07 A212 A940 B152 C116 C802 C803 C804 C805 C806 C807 M411 M782 M904
M905 Q130 Q454 Q613 R032 R1RUV-K R1RUV-M
08 A331 A940 B133 B720 B770 B823 B831 C802 C803 C804 C805 C806 C807
M411 M782 M904 M905 M910 Q130 Q454 Q613 R032 R01496-K R01496-M
09 A331 A940 B115 B720 B770 B813 B831 C802 C803 C804 C805 C806 C807
M411 M782 M904 M905 M910 Q130 Q454 Q613 R032 R01942-K R01942-M
10 A331 A351 C730 C810 M411 M782 M904 M905 Q130 Q454 Q613 R032 R1RUX-K
R1RUX-M
11 A331 A940 C107 C730 C801 C802 C803 C804 C806 C807 M411 M782 M904
M905 Q130 Q454 Q613 R032 R06079-K R06079-M
12 A680 A940 C116 C540 C730 C801 C802 C803 C804 C805 C806 M411 M782
M904 M905 M910 Q130 Q454 Q613 R032 R01545-K R01545-M
13 A680 A940 B134 C116 C802 C803 C804 C805 C806 C807 M411 M782 M904
M905 Q130 Q454 Q613 R032 R11619-K R11619-M
14 A680 A940 B252 C730 C802 C803 C804 C805 C806 C807 M411 M782 M904
M905 Q130 Q454 Q613 R032 R11620-K R11620-M
15 A349 A940 B133 B720 B770 B823 B831 C802 C803 C804 C805 C806 C807
M411 M782 M904 M905 Q130 Q454 Q613 R032 R03136-K R03136-M
16 A349 A940 B115 B720 B770 B813 B831 C802 C803 C804 C805 C806 C807
M411 M782 M904 M905 Q130 Q454 Q613 R032 R03137-K R03137-M
17 A349 A351 C730 C810 M411 M782 M904 M905 Q130 Q454 Q613 R032 R1RUY-K
R1RUY-M
18 A349 A940 C107 C520 C730 C801 C802 C803 C804 C806 C807 M411 M782
M904 M905 Q130 Q454 Q613 R032 R04567-K R04567-M

19 A313 A940 B133 B720 B770 B823 B831 C802 C803 C804 C805 C806 C807
 M411 M782 M904 M905 Q130 Q454 Q613 R032 R13442-K R13442-M
 20 A313 A940 B115 B720 B770 B813 B831 C802 C803 C804 C805 C806 C807
 M411 M782 M904 M905 Q130 Q454 Q613 R032 R10785-K R10785-M
 21 A313 A351 C730 C810 M411 M782 M904 M905 Q130 Q454 Q613 R032 RA1RUZ-K
 RA1RUZ-M
 22 A382 A940 C116 C540 C730 C801 C802 C803 C804 C805 C806 M411 M782
 M904 M905 M910 Q130 Q454 Q613 R032 R01524-K R01524-M
 23 A382 A940 B134 C116 C802 C803 C804 C805 C806 C807 M411 M782 M904
 M905 Q130 Q454 Q613 R032 RA1RV0-K RA1RV0-M
 24 A332 C810 M411 M782 M904 M905 M910 Q130 Q454 Q613 R032 R01670-K
 R01670-M
 25 A430 A940 C108 C550 C730 C801 C802 C803 C804 C805 C807 M411 M782
 M904 M905 M910 Q130 Q454 Q613 R032 R01520-K R01520-M
 26 A548 A940 C108 C550 C730 C801 C802 C803 C804 C805 C807 M411 M782
 M904 M905 M910 Q130 Q454 Q613 R032 R01504-K R01504-M
 27 A212 A940 C116 C550 C730 C801 C802 C803 C804 C805 C806 M411 M782
 M904 M905 Q130 Q454 Q613 R032 R10170-K R10170-M
 28 A212 A940 B134 C116 C802 C803 C804 C805 C806 C807 M411 M782 M904
 M905 Q130 Q454 Q613 R032 RA1RV1-K RA1RV1-M
 29 A680 A940 C108 C550 C730 C801 C802 C803 C804 C805 C807 M411 M782
 M904 M905 M910 Q130 Q454 Q613 R032 R02022-K R02022-M
 30 A313 A940 C107 C520 C730 C801 C802 C803 C804 C806 C807 M411 M782
 M904 M905 Q130 Q454 Q613 R032 R03135-K R03135-M
 31 B114 C810 M411 M782 M904 M905 M910 Q130 Q454 Q613 R032 R01666-K
 R01666-M
 32 H4 H498 H9 J0 J011 J1 J171 M280 M316 M321 M332 M342 M381 M391 M416
 M620 M782 M904 M905 Q130 Q454 Q504 Q613 R032 R043 RA1M0D-K RA1M0D-M
 33 H4 H498 H9 J0 J011 J1 J171 M280 M315 M321 M332 M343 M381 M391 M416
 M620 M782 M904 M905 Q130 Q454 Q504 Q613 R032 R043 R20116-K R20116-M
 34 A111 A960 C710 J0 J012 J2 J272 K0 K4 K431 M220 M222 M231 M272 M282
 M312 M321 M332 M343 M349 M381 M391 M411 M510 M520 M530 M540 M620
 M630 M782 M904 M905 Q130 Q454 Q504 Q613 Q616 R032 R043 R05324-K
 R05324-M RA1438-K RA1438-M
 35 H4 H401 H481 H5 H589 H8 M225 M231 M272 M281 M312 M323 M332 M342 M383
 M393 M416 M620 M782 M904 M905 Q130 Q454 Q504 Q613 Q616 R032 R043
 RA1RVP-K RA1RVP-M
 36 B415 B515 B615 B701 B712 B720 B721 B732 B741 B742 B743 B760 B813
 B815 B831 D010 D019 D020 D029 D040 D049 F010 F019 F020 F021 F029
 G001 G002 G010 G011 G012 G013 G014 G015 G016 G017 G019 G020 G021
 G022 G029 G030 G039 G040 G050 G100 G111 G112 G113 G221 G299 G553
 G563 H100 H102 H103 H121 H141 H181 H401 H421 H441 H481 H492 H494
 H498 H521 H541 H581 H592 H594 H598 H713 H716 H721 H722 H723 H731 J0
 J011 J012 J013 J014 J1 J111 J112 J113 J131 J132 J133 J171 J172 J173
 K742 M111 M112 M113 M114 M115 M116 M119 M210 M211 M212 M213 M214
 M215 M216 M220 M221 M222 M223 M224 M225 M226 M231 M232 M233 M240
 M250 M271 M272 M273 M280 M281 M282 M283 M311 M312 M313 M314 M315
 M316 M320 M321 M322 M323 M331 M332 M333 M334 M340 M342 M343 M344
 M349 M351 M361 M371 M381 M391 M392 M393 M411 M412 M413 M414 M415
 M416 M510 M511 M512 M513 M520 M521 M522 M523 M530 M531 M532 M533
 M540 M541 M542 M543 M620 M630 M782 M904 M905 Q130 Q454 Q504 Q613
 R032 R043 0016-85801-K 0016-85801-M
 37 B415 B515 B615 B701 B702 B712 B713 B720 B721 B722 B723 B732 B741
 B742 B743 B744 B813 B814 B815 B831 B832 B833 C216 D010 D019 D020
 D029 D040 D049 F010 F012 F013 F014 F015 F016 F019 F020 F021 F029
 F113 F123 G010 G019 G020 G021 G029 G030 G039 G040 G050 G100 G111
 G221 G299 G553 G563 H100 H101 H102 H103 H181 H182 H183 H401 H402
 H403 H404 H405 H422 H423 H481 H482 H483 H484 H498 H521 H581 H582
 H583 H598 H599 H713 H716 H721 H731 J011 J171 J197 J371 K431 K433
 K640 K742 K799 L610 L620 L630 L640 L650 L660 L699 L722 M121 M122

M123 M124 M125 M126 M132 M135 M150 M210 M211 M212 M213 M214 M215
M216 M220 M221 M222 M223 M224 M225 M226 M231 M232 M233 M280 M311
M312 M313 M314 M315 M316 M320 M321 M331 M332 M333 M334 M340 M342
M343 M344 M349 M351 M361 M371 M381 M391 M411 M412 M413 M414 M415
M416 M510 M511 M512 M520 M521 M522 M523 M530 M531 M532 M540 M541
M542 M620 M630 M640 M650 M782 M904 M905 Q130 Q454 Q504 Q613 R032
R043 0016-85802-K 0016-85802-M

Polymer Indexing (PS):

<01>

- *001* 018; G0237 G0102 G0022 D01 D12 D10 D18 D51 D53 G0271-R G0260 D26
F36 F35 G0340-R G0339 D58 D63 F41 F89 G0384-R D60 D61-R F16 F35-R
F26-R F34 F54 F53 F62; R00446 G0282 G0271 G0260 G0022 D01 D12 D10
D26 D51 D53 D58 D60 D83 F36 F35; R00460 G0306 G0271 G0260 G0022 D01
D12 D10 D26 D51 D53 D58 D60 D84 F36 F35; H0000; H0011-R; L9999
L2573 L2506; L9999 L2528 L2506; L9999 L2391; L9999 L2073; M9999
M2073; K9472; P1741 ; P0088 ; P0099
- *002* 018; G0011 G0000 D01 D51 D52 G0022-R D53 G0102-R G0022 D12 D10 D18
G0340-R G0339 G0260 D26 D58 D63 F41 F89 G0453-R F70 F93 D11 D22-R
D23 D22 D18-R D13-R D76 D42 D54 D59 F07-R F00 F34 F53 F54 F50 N- SA
O- 6A S- D77 D78 D60 F05 F35-R F11 F61 F63 F51 F26-R F04 F16 F24
F70-R F72; H0000; H0022 H0011; M9999 M2153-R; H0044-R H0011; P1741
; P0088
- *003* 018; R00351 G1558 D01 D23 D22 D31 D42 D50 D73 D82 F47; H0000; P0055
; P8004 P0975 P0964 D01 D10 D11 D50 D82 F34; M9999 M2153-R; M9999
M2200; K9325
- *004* 018; D23 D22 D75 D45 D11 D10 D12 D13-R D18-R D22-R D76 D77 D78 D42
D50 D51-R D52 D51 D60 D61-R F00 F07-R F34 F53 F54 F50 P- SA O- 6A
S- F35-R F05 F11 F70-R F72 F61 F63 F51 F26-R F04 F16 F24; H0260;
P1081-R F72 D01; P8060 D01 D10 D12 D18 D19 D51 D59; P1490-R F61 D01
; P1412 H0293 P0044 D23 D22 D41 D51 D56 D59 F07; P1503 H0293 P0044
D01 D23 D22 D43 D51 D56 D59 F00; P0964-R F34 D01; P1854; H0044-R
H0011
- *005* 018; ND01; Q9999 Q7476 Q7330; Q9999 Q8311 Q8264; Q9999 Q8355 Q8264;
Q9999 Q9110; B9999 B3407 B3383 B3372; B9999 B3509 B3485 B3372;
B9999 B5094 B4977 B4740; K9836 K9790; K9870 K9847 K9790; B9999
B3532 B3372; B9999 B4580 B4568; B9999 B4706-R B4568; B9999 B3225
B3203 B3190; B9999 B3350 B3190; B9999 B3521-R B3510 B3372

Derwent Registry Numbers: 1496-U; 1504-U; 1505-U; 1520-U; 1524-U; 1525-U;
1545-U; 1666-U; 1670-U; 1942-U; 2022-U

Specific Compound Numbers: R04198-K; R04198-M; R04508-K; R04508-M; R01505-K
; R01505-M; R01525-K; R01525-M; R06977-K; R06977-M; R08290-K; R08290-M;
RA1RUV-K; RA1RUV-M; R01496-K; R01496-M; R01942-K; R01942-M; RA1RUX-K;
RA1RUX-M; R06079-K; R06079-M; R01545-K; R01545-M; R11619-K; R11619-M;
R11620-K; R11620-M; R03136-K; R03136-M; R03137-K; R03137-M; RA1RUY-K;
RA1RUY-M; R04567-K; R04567-M; R13442-K; R13442-M; R10785-K; R10785-M;
RA1RUZ-K; RA1RUZ-M; R01524-K; R01524-M; RA1RV0-K; RA1RV0-M; R01670-K;
R01670-M; R01520-K; R01520-M; R01504-K; R01504-M; R10170-K; R10170-M;
RA1RV1-K; RA1RV1-M; R02022-K; R02022-M; R03135-K; R03135-M; R01666-K;
R01666-M; RA1MOD-K; RA1MOD-M; R20116-K; R20116-M; R05324-K; R05324-M;
RA1438-K; RA1438-M; RA1RVP-K; RA1RVP-M

Generic Compound Numbers: 0016-85801-K; 0016-85801-M; 0016-85802-K;
0016-85802-M

Key Word Indexing Terms:

- *01* 130045-0-0-0-CL 130121-0-0-0-CL 139835-0-0-0-CL 5119-0-0-0-CL
130590-0-0-0-CL 131123-0-0-0-CL 285185-0-0-0-CL 129415-0-0-0-CL
129416-0-0-0-CL 285188-0-0-0-CL 130320-0-0-0-CL 129539-0-0-0-CL
132402-0-0-0-CL 132403-0-0-0-CL 129751-0-0-0-CL 129752-0-0-0-CL
285189-0-0-0-CL 130169-0-0-0-CL 132822-0-0-0-CL 131423-0-0-0-CL
285190-0-0-0-CL 129545-0-0-0-CL 285192-0-0-0-CL 96038-0-0-0-CL
866-0-0-0-CL 1262-0-0-0-CL 131184-0-0-0-CL 285193-0-0-0-CL

129363-0-0-0-CL 129750-0-0-0-CL 107015-0-0-0-CL 276981-0-0-0-CL
93232-0-0-0-CL 129629-0-2-0-CL, ST 285221-0-0-0-CL 0016-85801-CL
0016-85802-CL